ACTION MEMORANDUM

MCLAREN PIT RESPONSE ACTION
NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

Gallatin National Forest - Gardiner Ranger District
Custer National Forest - Beartooth Ranger District

Park County, Montana

January 2002

ACTION MEMORANDUM

Date: January 28, 2002

Subject: Request for Removal Action
New World Mining District Response and Restoration Project
Gallatin and Custer National Forests

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I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed non-time-critical Response Action described herein for the McLaren Pit at the New World Mining District (District), located in Park County, Montana. Response activities at the McLaren Pit represent the second response action proposed during this multi-year project. The McLaren Pit is the highest ranked mine waste source area in the District based on a modified hazard ranking of all mine waste sources in the project area. McLaren Pit wastes account for the majority of the waste located on District Property. As the cleanup of mining wastes present in the District will be conducted over several years, this Action Memorandum only presents the decision for cleanup proposed for the McLaren Pit and selected wastes within the headwaters of Daisy Creek. An Overall Project Work Plan prepared for the project (Maxim, 1999a) and an annual work plan prepared for the project (Maxim, 2001b) describe in detail the process for prioritizing sites and the overall schedule for cleanup of historic mining wastes present in the District.

An Engineering Evaluation/Cost Analysis (EE/CA) was prepared to develop various alternatives that address impacts associated with hazardous substances present in the headwaters of Daisy Creek (Maxim, 2001a). The EE/CA provides the details and basis for the proposed response action and is attached to this memorandum as a supporting document. The discussion provided in this memorandum will substantiate the need for a removal response at the McLaren Pit, identify the proposed action, and explain the rationale for the removal.

The scope of the McLaren Pit Response Action is limited to reducing or eliminating uncontrolled releases of metals from mine waste dumps in the Daisy Creek headwaters. Addressing

environmental impacts associated with solid mine wastes presumes that some reduction in contaminant concentrations will occur in surface water, groundwater, and new stream sediment accumulation as a result of removing or controlling the primary sources of contamination present in solid mine wastes.

The scope of this response action does not include directly addressing contaminated groundwater, the McLaren Mine adit discharge, or other sources of potential contamination in the headwaters of Daisy Creek. More comprehensive analysis of response technologies applicable to the McLaren Mine adit discharge will be completed on a District-wide basis in 2003/2004. Response actions associated with adit discharges in the District will likely be evaluated in a separate EE/CA. More direct active efforts to capture and treat groundwater would involve considerable additional expense and infrastructure development, and are not considered further at this time. This decision may need to be revisited as second order removal actions are considered and evaluated in future years.

Contaminated sediments that have been historically deposited in and along Daisy Creek are considered second order contaminate sources that may need to be addressed in future response actions. Sediments are not being addressed at this time under this response action because the McLaren Mine adit discharge and elevated levels of contaminants in other natural discharges will continue to contaminate sediment in Daisy Creek and the upper portion of the Stillwater River. Only when all discharge sources are controlled in the headwaters of Daisy Creek will a sediment response action be effective. The performance of source control options will be assessed, and strategies for groundwater migration control/in-situ treatment and downstream contaminated sediment sources will be revisited when this performance assessment is complete.

The McLaren Pit Response Action will be executed by following the non-time-critical removal action process as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA; 42 USC 9604) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR Part 300). Response actions -- as explained in the U.S. Environmental Protection Agency's (EPA) *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* -- are implemented to respond to "the cleanup or removal of released hazardous substances from the environment … as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment…" (EPA, 1993).

II: SITE CONDITIONS AND BACKGROUND

A. Site Description

The primary environmental issues within the District are associated with impacts from historic and recent gold, silver, copper, and lead mining activities which have occurred in the area since prospecting was initiated in about 1869. Mining disturbances are primarily situated on lands managed by the USDA Forest Service. Human health and environmental issues are related to

elevated levels of heavy metal contaminants present in mine waste piles, open pits, acidic water discharging from mine openings, and sediments.

For the McLaren Pit Response Action, environmental data collected by numerous parties over the years show that mine waste dumps located on District Property in the headwaters of Daisy Creek are contributing sediments and contaminants of concern to the surrounding land and nearby streams. Mine waste has been subject to erosion and leaching of contaminants since these materials were dumped when the mining operations were active. District Property is defined as including all property or interests in property that Crown Butte Mining, Inc. (CBMI) relinquished to the United States under the terms and conditions of a Settlement Agreement and Consent Decree entered by the United States District Court for the District of Montana in 1998.

1. Removal Site Evaluation

In 1996, the EPA began a site investigation of mining impacts in the District, which was performed by URS Operating Systems (UOS). The EPA investigation involved installing monitoring wells, surface water sampling, groundwater monitoring, and completing a groundwater tracer study. The results of these studies were published in a technical report (UOS, 1998) that included the following: a review of all previous surface water and groundwater data collected by the Montana Department of Natural Resources and Conservation, USDA Forest Service, CBMI, EPA, and UOS; an evaluation of the data collected during the 1996, 1997, and 1998 field seasons; and an overall evaluation of the complete data set with respect to restoration and reclamation of the historic abandoned mining operations. Site investigation data adequately document impacts to human health and the environment associated with historic mining. The Consent Decree negotiated with the former owner of the mining interests in the District provides the terms and funding for cleanup efforts.

Current conditions in the Daisy Creek drainage show impacts to soil, sediment, and water resources from both mining impacts and natural sources of metals and acidity. Surface water in Daisy Creek is impacted by runoff from mine waste dumps and other disturbances, as well as discharges from adits, seeps, and natural groundwater that carry high metal loads. Mine wastes and other contaminant sources at the headwaters of Daisy Creek significantly impact surface water quality, due to total concentrations of arsenic, cadmium, copper, lead, mercury, and zinc that exceed average background concentrations in the mineralized, acidic, McLaren Pit wastes. Several parameters, including total recoverable aluminum, copper, iron, lead (at DC-1 only), manganese, and zinc exceed Montana's water quality standards (MDEQ, 1998). The McLaren Mine adit discharge exceeds water quality standards for aluminum, copper, iron, and lead, although the mean flow from this adit based on eight measurements was only 14 gallons per minute (gpm). Stream sediment data indicate that arsenic, copper, and lead concentrations are considerably higher in sediment than in waste rock. These data also indicate that arsenic, chromium, copper, iron, manganese, lead and zinc in stream sediments are significantly above background levels for these elements in soil. Groundwater quality data indicate there are significant impacts to groundwater from acidic and metal laden sources, presumably the McLaren ore deposit and backfilled waste rock material.

2. Physical Location

The New World Mining District falls within the boundaries of the Gallatin and the Custer National Forests and abuts Yellowstone National Park's northeast corner. The Absaroka-Beartooth Wilderness Area bounds the District to the north and east. To the south of the District is the Montana-Wyoming state line. The District lies entirely within Park County, Montana.

The communities of Cooke City and Silver Gate, Montana are the only population centers near the District. The neighboring communities of Mammoth, Wyoming and Gardiner, Montana are located about 80 kilometers (50 miles) to the west. Red Lodge, Montana is about 105 kilometers (65 miles) to the northeast, via the Beartooth Highway, and Cody, Wyoming is located 100 kilometers (60 miles) to the southeast. Only two routes of travel are open on a year-round basis to the District: the Sunlight Basin road, which allows access to within a few miles of the District in the wintertime, and the highway between Mammoth and Cooke City. The Beartooth Highway is closed during the winter.

3. Site Characteristics

The District is located at an elevation that ranges from 2,400 meters (7,900 feet) to over 3,200 meters (10,400 feet) above sea level. The site is snow-covered for much of the year. The District covers an area of about 100 square kilometers (40 square miles). Historic mining disturbances affect about 20 hectares (50 acres) of District Property according to recent measurements made by the USDA Forest Service Interagency Spatial Analysis Center.

The topography of the District is mountainous, with the dominant topographic features created by glaciation. The stream valleys are U-shaped and broad while the ridges are steep, rock-covered, and narrow. Much of the District is located at or near tree line, especially where the major mining disturbances are located.

The District is situated at the headwaters of three river systems, which all eventually flow into the Yellowstone River. The three tributary rivers are the Clark's Fork of the Yellowstone, the Stillwater, and the Lamar. The Lamar River flows through Yellowstone Park. The major tributary streams in the District include Daisy, Miller, Fisher, Goose, Sheep, Lady of the Lake, Republic, Woody, and Soda Butte creeks.

4. Release or Threatened Release into the Environment of a Hazardous Substance

a. Hazardous Substances

The hazardous substances as defined in section 101(14) of CERCLA found at the site include aluminum, arsenic, cadmium, copper, iron, and zinc. Concentrations of hazardous substances in solid wastes and surface water are documented in the McLaren Pit Response Action EE/CA (Maxim, 2001a).

b. Sampling and Analytical Data

The sampling methods used to collect the chemical data are described in the McLaren Pit Response Action EE/CA prepared by Maxim Technologies under contract to the USDA Forest Service (Maxim, 2001a). Waste rock samples were collected in 1996 by CBMI and in 1999 and 2000 by the USDA Forest Service. Laboratory analytical results from waste dump samples indicate that mine waste contains elevated levels of arsenic, cadmium, copper, lead, and zinc as compared to background concentrations. Long-term monitoring of surface water in Daisy Creek show that water quality standards for aquatic life are particularly exceeded for aluminum, cadmium, copper, and zinc as well as other parameters including pH, suspended solids, and iron.

c. Mechanism for Past, Present, or Future Release

The waste dumps present in the headwaters of Daisy Creek are largely unvegetated and unconfined. Runoff erodes material into Daisy Creek and potentially leaches metals from the wastes into groundwater. Portions of the selected waste dumps are in direct contact with surface water at certain times of the year.

d. Events or Features that could Spread or Accelerate Releases

Large runoff events, particularly during the spring when twelve to twenty feet of snowpack melts off the sites, presents potential conditions for increasing erosion of the dumps into surface water drainages. Water quality in Daisy Creek is impacted by metals associated with the mine waste dumps and mineralized host rock. Several water quality parameters exceed Montana's water quality standards (Montana Circular WQB-7) as well as both the acute and chronic aquatic life standards in portions of Daisy Creek and the Stillwater River.

e. Properties that Influence the Rate of Releases

The overall site conceptual model for the McLaren Pit is complex, and site investigations are ongoing to provide insight into the primary sources of mining related contaminants, the likely mechanisms that are involved in releasing contaminants into the environment, and the exposure pathways that present risks to humans and the environment. The conceptual model presented in the Overall Project Work Plan (Maxim, 1999a), and in the McLaren Pit EE/CA (Maxim, 2001a) illustrates that the major sources of contaminants are acidic, metal-laden mine waste dumps

located at mine openings and massive sulfide ore deposits underground that are exposed to the atmosphere by either mine workings or natural fracturing and faulting. Other secondary sources of contaminants include stream sediments that have been transported downstream from other sources. The primary mechanisms of movement of metal-laden mine wastes include the following:

- Erosion into surface water courses
- Dissolution of contaminants in runoff
- Infiltration of dissolved metals into soil and groundwater
- Movement of impacted water through open underground mine workings and improperly abandoned exploratory borings
- Groundwater discharge into surface water
- Contaminated surface water flow to groundwater.

Mine waste sources in the District are many and widely scattered throughout the 64 square kilometer (40 square mile) area that the District encompasses. There are in excess of over 150 mine dumps on District Property totaling about 230,000 cubic meters (300,000 cubic yards) of solid waste, and more than 20 mine discharges, numerous acid seeps, and several kilometers of contaminated in-stream sediments. The wastes located in the headwaters of Daisy Creek account for about 67% (155,000 cubic meters) of the total waste located on District Property.

Quantification of metal loading from mining wastes located in the headwaters of Daisy Creek has been estimated by several sources, including the U.S. Geological Survey (Nimick and Cleasby, 2001) and Maxim (2001a). Nimick estimated that significant surface water loading of copper (71%) could be attributed to the most upward reaches of Daisy Creek, within the area that would be influenced by the McLaren Pit. Copper loading was also significant in groundwater, with 46% of the total dissolved copper load in Daisy Creek attributable to groundwater, much of this occurring downstream of where the surface water load of copper was measured.

Maxim (2001a) estimated that metals loading from McLaren Pit waste rock (the majority of mine waste within the headwaters of Daisy Creek) makes up about 10% to 20% of the sulfate, aluminum, and copper load in Daisy Creek. Metals' loading is greatly affected by seasonality, with the greatest loads occurring in the spring and fall, and the least amount of loading from the pit occurring in the summer. Estimated contributions of metals as modeled by Maxim are not without uncertainty, and a greater or lesser amount of loading may actually be occurring.

5. National Priority List (NPL) Status

CERCLA, sometimes referred to as the "Superfund" statute, was enacted in 1980 to address sites where releases of hazardous substances pose a threat to public health or the environment. Under CERCLA, the nation's most contaminated sites are placed on the National Priorities List (NPL) by the EPA. No mine sites in the District are listed or have been proposed for listing on the NPL by the EPA or the Montana Department of Environmental Quality (MDEQ) because, to date,

hazard ranking evaluations of the worst sites in the District (e.g. McLaren tailings) do not result in a hazard score warranting listing.

6. Maps, Pictures, and other Graphic Representations

A location map and map of site features are displayed in the attached Final EE/CA (Maxim, 2001a).

B. Other Actions to Date

1. Previous Actions

On August 12, 1996, the United States signed a Settlement Agreement with CBMI to purchase CBMI's holdings in the District. The resulting transfer of property to the U.S. government effectively ended CBMI's proposed mine development plans and provided $22.5 million to cleanup historic mining impacts to specific properties in the District. In June 1998, a Consent Decree, which was signed by all interested parties and CBMI and approved by the United States District Court, finalized the terms of the Settlement Agreement and formalized the process by which funds would be made available for mine cleanup.

Mitigation of historic mining wastes has been an on-going interest of numerous parties since the 1970s. One of the first to investigate revegetation in the District was the USDA Forest Service Intermountain Research Station (Brown, 1994; 1995). This research has focused on reclamation of high elevation mine disturbances, with the bulk of the research focused on the wastes present in the McLaren Pit. Larger scale reclamation efforts were conducted by CBMI as part of exploration and proposed mine development work. In 1993, CBMI began surface restoration work to reclaim the McLaren Pit, as well as areas disturbed by exploration activity in the Como Basin. Reclamation activities at the McLaren Pit included recontouring, construction of runon control ditches, treating acid soils with a lime amendment, and fertilizing and seeding with native grasses. When comparing metals concentrations at water quality monitoring stations in Daisy Creek just below the pit, it is apparent that recontouring and revegetating the pit wastes have contributed to lowering total recoverable metals concentrations (Maxim, 2001c). These results were likely obtained by reducing the time and amount of surface water in contact with pit wastes through the elimination of surface water ponding, and by changing the runoff/infiltration water balance in the pit. From 1993 to 1996, CBMI also reclaimed a number of exploration roads and drill pads.

2. Current Actions

The primary purpose in completing a response action at the McLaren Pit is to mitigate certain threats to the environment that are consistent with Overall Project Work Plan objectives for the site (Maxim, 1999a). Work in the headwaters of Daisy Creek is part of the larger response and restoration activities that the USDA Forest Service is conducting in the District as a whole.

In March 1999, the USDA Forest Service initiated the planning process for overall project cleanup. Planning documents were in place in June 1999, and work was begun on the project with the monitoring of surface water and groundwater quality at selected monitoring points. Activities conducted in 1999 included the following:

- Establishing a database management system for the project
- Cataloging existing information available for the site
- Completing a technical evaluation of existing information and data
- Improving portions of Daisy Pass and Lulu Pass roads to accommodate construction traffic
- Improving a previously constructed surface water diversion around the Como Shaft
- Developing a suitable map base of District Property to support engineering design
- Evaluating areas of erosion contributing excessive sediment to area drainages
- Completing a repository siting evaluation report and collecting hydrogeologic data on two prospective repository sites
- Completion by the U.S. Geological Survey of a surface water tracer study on Daisy Creek to determine surface water inputs
- Obtaining data to fill identified data gaps for proposed Response Actions at the site
- Identifying unrecorded mine waste dumps, adits, and boreholes, and developing a database of site characteristics
- Ranking mine waste sources according to a modified Hazard Ranking System to aid in the prioritization of sites slated for cleanup
- Identifying unrecorded cultural features
- Determining the feasibility of reopening the Glengarry Adit
- Evaluating water quality treatment alternatives for acid mine discharges
- Preparing the Selective Source Response Action EE/CA
- Satisfying the requirements of the petition for temporary standards submitted by CBMI

Cleanup and Response Actions completed in 2000 included the following:

- Maintaining community relations
- Maintaining the project database and the project Web site
- Continuing long-term monitoring of surface water, groundwater, and revegetated areas in the District as well as in the McLaren Pit area.
- Evaluating mass loading of metals from specific source areas to assist in the overall evaluation of potential response actions
- Completing the hydrologic and geologic evaluation of the McLaren Pit area, which involved reviewing historic mine maps, analyzing groundwater and surface water samples, measuring infiltration rates in pit wastes, analyzing pore water samples collected from lysimeters installed in pit wastes, and performing geochemical and hydrologic models that used the data to describe interactions between water resources and the pit wastes.
- Completing the repository siting evaluation
- Evaluating water quality treatment alternatives for acid mine discharges
- Reopening the Glengarry Adit to assess the feasibility of potential response actions directed at reducing the input of acid mine drainage emanating from the adit

- Evaluating erosion control measures in the Como Basin
- Completing a surface water tracer study on Miller Creek
- Identifying mine waste dumps, adits, and boreholes within the District
- Completing road improvements initiated in 1999 and installing a bridge across Fisher Creek at the current location of the low water crossing

Finally, in 2001, the following cleanup and investigation activities have taken place:

- Maintaining community relations
- Maintaining the project database and the project Web site
- Continuing long-term monitoring of surface water and groundwater
- Preparing the McLaren Pit Response Action EE/CA
- Reopening and rehabilitating the Como raises from the Glengarry Mine
- Constructing the Selective Source Response Action
- Obtaining data to fill identified data gaps for proposed Response Actions at the site

The USDA Forest Service completed a draft version of an EE/CA for the McLaren Pit Response Action on July 27, 2001. A copy of the draft version of the EE/CA was placed in the information repositories in Cooke City (Chamber of Commerce), Gardiner (Gardiner Ranger District Office), and Bozeman (Gallatin National Forest Supervisor's Office). A public notice appeared in the Bozeman Chronicle, Livingston Enterprise, Cody Enterprise, and Powell Tribune announcing that the draft EE/CA was available, setting the time for the comment period, and listing the location of the information repositories. A 30-day comment period was established which ended on September 10, 2001. Two written comments were received from the public, both supporting the selection of the preferred alternative. A response to comments received is included in the Final EE/CA, which is attached to this Action Memorandum.

C. State and Local Authorities' Role

1. State and Local Actions to Date

The USDA Forest Service has been cooperating throughout the project with the states of Montana and Wyoming, the United States Environmental Protection Agency, the United States Department of Interior, and the local county commissioners. The cooperating agencies have reviewed the various project documents and have provided comments to the USDA Forest Service.

2. Potential for Continued State/Local Response

Neither the State nor local authorities have the resources to conduct a Response Action at this time. State and local constituents will continue to be involved in site activities and will be kept apprised of all activities of this Response Action.

III. THREATS TO PUBLIC HEALTH OR WELFARE AND THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES.

The EE/CA indicates there is a threat to public health or welfare, or to the environment as set forth in the National Contingency Plan (NCP) at 40 CFR 300.415(b)(2). Briefly, this threat is the risk of continued and future metals contamination of surrounding lands, surface water, and groundwater in the Daisy Creek and Stillwater River watersheds.

Due to the concentrations of metals in mine waste sources (Maxim, 2001a), conditions at these sources meet the criteria for initiating a Response Action under 40 CFR 300.415(b)(2) of the NCP. The following factors from 40 CFR 300.415(b)(2) of the NCP form the basis for USDA Forest Service's determination of the threat present and the appropriate action to be taken:

(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

(ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;

(iii) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate;

(iv) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

(v) The unavailability of other appropriate federal or state response mechanisms to respond to the release.

A. Threats to Public Health or Welfare

Heavy metals associated with the Daisy Creek headwater waste rock sources can affect human health through inhalation or ingestion. The total hazard quotient for arsenic, copper, and zinc present in dumps included in the McLaren Pit Response Action exceed 1.0, indicating that these contaminants pose a human health risk. The total hazard quotient for zinc is 12, which is attributed to the risk posed by ingestion of fish taken from the stream by recreationists. Because there are no fish in Daisy Creek at the present time, this risk of exposure to zinc in surface water is currently not a pathway at this site. Therefore, based on these data, arsenic and copper are the contaminants that present a human health risk associated with the waste dumps considered for this Response Action. Site specific testing on leachability of arsenic from the waste dumps shows that arsenic is not leachable and is therefore a human health concern in only the solid form.

B. Threats to the Environment

Two groups of ecological receptors have been identified as potentially being affected by contamination associated with historic mining present in the District. The first group includes aquatic life and wetlands associated with Daisy Creek and the Stillwater River located downgradient of the source areas. The second group of receptors is native terrestrial plants at the site whose ability to grow in soil or mine waste is limited by relatively high concentrations of certain metals.

The pathways by which ecological receptors could become exposed to contaminants at the site are through direct contact with soils, ingestion of contaminated soils, direct contact with water and sediments, ingestion of water and sediments, and ingestion of contaminated food. The Stillwater River as a cold water fishery has been impacted by the elevated heavy metals concentrations (principally copper and iron). A comparison of metals levels measured in mine waste samples collected from selected dumps to literature guidelines and state aquatic water quality standards indicate that aluminum, copper, iron, and zinc pose a risk to organisms in the aquatic environment. In addition, arsenic, cadmium, and copper appear at phytotoxic levels in waste dumps, although no site-specific studies of metals concentrations in vegetation growing on reclaimed or abandoned mine wastes in the District have been done to determine if grazing animals would be at risk by consumption of plants that become established on mining wastes.

A threat to the environment also exists through the migration of, and airborne exposure to, contaminated dust. On dry windy days, dust may migrate to the surface waters, wetlands, and other recreational areas as they become airborne.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

The proposed action for the McLaren Pit Response Action is consolidation of waste rock from dumps in the Daisy Creek headwaters into the McLaren Pit, and capping of the consolidated wastes with an impermeable cap (Alternative 3C in the EE/CA). The removal action will address the immediate threat to the environment posed by the mine waste piles. More detail on the selection process, removal action objectives, and alternative analysis can be found in the EE/CA.

The waste dumps slated for consolidation into the pit are the McLaren Pit spoils (wastes located below the county road and west of the pit) and the multicolor dump. The dumps are all located within the Custer National Forest. Approximately 18,400 cubic meters (24,000 cubic yards) of waste rock are contained in the dumps, which cover about 1.4 hectares (3.5 acres) of disturbance. A more detailed description of the proposed action is provided below.

- *Site Preparation:* Clearing and grubbing of outlying waste rock dump sites; separating combustible and non-combustible debris; and, debris disposal.

- *Consolidation of Wastes:* Outlying, waste rock dumps including the Multicolored Dump and McLaren Spoils would be excavated, moved, and placed onto the McLaren Pit.

- *Grade Consolidated Wastes in the McLaren Pit:* Consolidated wastes will be graded to a stable configuration, and the upper waste surface prepared for placement of the liner and cap system.

- *Borrow Area Development*: A soil borrow area will be developed to supply cover materials for cap construction. Adequate soil materials are available from a glacial till deposit located east of the Lulu Pass road, about ½ mile north of US Highway 212. There are other closer sources of glacial till material in the headwaters of Daisy Creek and Miller Creek that are suitable for use as a cover over the McLaren Pit mine wastes. These other sources are more desirable than the till located on the Lulu Pass road for several reasons.

  For the Daisy Creek source, since soil in Daisy Creek originates in the same area as the McLaren Pit, this soil material is the most ecologically similar to the area, and, all things being equal, a preferable source of borrow. Also, the Daisy Creek site is attractive from the standpoint that most of the disturbance involved with Response Action construction would be confined to the same area where the mine impacts are being remediated. Another major consideration is haul traffic and the safety issue involved with potential accidents between tourist traffic and haul traffic on the Daisy Pass road. An estimated 100 round-trip truck trips per day is estimated for the construction of the cap over a period of 60 days during the summer. The shorter haul and the limited exposure to tourist traffic from the Daisy Creek and Miller Creek sources lessens this hazard considerably.

  Potential source areas for soil cap material are being considered in detail during the design phase. It is likely that the Daisy Creek moraine will be the source selected for borrow because of the aforementioned attributes.

  Development of the soil borrow area will involve excavating borrow to a depth of about 3 to 6 meters (10 to 20 feet). The area of disturbance will vary based on depth of material present and the desired reconfigured topography for the borrow area. Construction elements will include developing sufficient access to the borrow site, clearing and grubbing vegetation, stockpiling topsoil, excavating borrow, regrading the borrow area, respreading stockpiled topsoil, revegetating the site with native grasses, and providing erosion controls.

- *Capping Wastes* – The capping system for the McLaren Pit uses a 60 mil HDPE synthetic liner in the cover system as a barrier layer. The synthetic liner would be placed on non-amended waste rock. A 60 centimeter (2 feet) thick coarse sand and gravel drainage layer (or equivalent drainage layer) and 90 centimeters (3 feet) of borrowed soil will be placed on top of the liner. The capping system for this sub-alternative requires about 20,500 cubic meters (26,800 cubic yards) of gravel for the drainage layer and about 33,600 cubic meters (44,000 cubic yards) of soil. Filter fabric would be placed over the drainage gravel to prevent piping of fines from the soil into the gravel.

- *McLaren Mine Adit Discharge* - Response technologies will not be applied to the adit discharge present at the McLaren Mine as part of this Response Action. At a later timeframe in the overall cleanup process for the New World site, all adit discharges, including the McLaren Mine adit, will be evaluated, and further actions will be determined. So that the proposed response action does not interfere with any future response actions at the McLaren Mine adit, the adit drainage will be routed from the current point of discharge to a drainage channel placed outside the area capped. The historic point of discharge where the existing adit flows leave the waste site will be constructed in the same or near-by location as exists under current conditions. The existing character and condition of the adit discharge will be essentially unchanged.

- *Revegetate Waste Dump Removal Sites:* The removal areas (McLaren Spoils and Multicolor Dump) will be regraded to blend with the surrounding topography, and a 15 cm (0.5 feet) lift of topsoil will be placed on the regraded surface. Topsoil will be obtained from SB-4B repository site or other nearby source. Revegetation of the removal areas will follow prescriptions developed by the USDA-FS Rocky Mountain Research Station specifically for revegetating amended mine wastes in the District. Revegetation prescriptions for mine waste specify amount and types of amendments recommended for organic matter, fertilizer, seeding, mulching, and use of erosion control blankets.

- *Monitoring and Maintenance* – Monitoring of vegetation, surface erosion, surface water, and groundwater will be conducted to assess and verify the performance of the capping system constructed on the consolidated wastes. Maintenance would be performed if monitoring indicated the capping system or reclaimed areas are not performing to the level expected.

a. Address Identified Human Health and Environmental Threats

In terms of reducing contaminant seepage and migration from the McLaren Pit, Alternative 3C is the most effective of the alternatives evaluated. This is because wastes will be placed below a geomembrane liner, and thus protected from infiltrating water. A drainage layer and soil cover placed on top of the liner will protect the liner from damage, prevent the public from direct contact with the waste, provide frost protection to the cap, and promote vegetation growth on the cap that will provide long-term stability.

The greatest risk to human health is exposure to dust and direct contact with wastes that result from recreational use of the area. Alternative 3C clearly offers the greatest reduction of risk to human health of all the alternatives evaluated by providing a barrier layer to direct contact with the wastes. Alternative 3C also reduces human health risks by consolidating the outlying wastes present in Daisy Creek into the McLaren Pit, thereby reducing the surface area of the wastes by 30% from the existing condition.

The greatest risk to the environment comes from degraded surface and groundwater quality and its impact to aquatic life. A 30% reduction in the surface area of waste exposed in the Daisy Creek headwaters through consolidation of outlying wastes into the pit will lessen exposure of the environment to contaminated media. However, significant improvement in surface or groundwater quality in the Daisy Creek or Stillwater drainages is not expected. The hydrologic evaluation of landfill performance model (HELP model) and load modeling studies suggest that the unconsolidated McLaren Pit wastes only contribute 10-20% of the total load to Daisy Creek. Even a reduction of the full 20%, or for that matter a reduction of 50% of copper loading to Daisy Creek, would not bring surface water in Daisy Creek into compliance with established surface water standards.

Failure to meet Montana surface water standards results principally because waste rock is not the only source of contaminants in the headwaters of Daisy Creek. The McLaren Pit EE/CA summarizes pertinent literature publications that demonstrate the effects of naturally occurring sulfide minerals in bedrock. These natural sources are believed to be a major source of metals and acid rock drainage. There are other sources present in the headwaters of Daisy Creek, including contaminated groundwater that is migrating from the headwaters area to Daisy Creek, and sediment transported from mine waste areas that has deposited in the streambed of Daisy Creek and the Stillwater River. Cleaning up or preventing seepage from wastes at the headwaters of Daisy Creek does not address these sources of metals contaminants in the Daisy Creek drainage.

b. Justification for Proposed Alternative

The USDA Forest Service has selected consolidation of the selected mine waste dumps in the McLaren Pit and capping in the pit because it provides the best combination of effectiveness, implementability, and cost effectiveness of the four alternatives and seven sub-alternatives evaluated for the McLaren Pit Response Action. Consolidation and capping the waste materials is an appropriate response because the waste materials directly impact tributary flow to Daisy Creek and the Stillwater River, and because such an action is in accord with the Consent Decree, Settlement Agreement, and Overall Project objectives. Although Montana B-1 water quality standards may not be met if this action is selected, no action is not an acceptable solution, and this action will mitigate, in part, impacts to human health and the environment that result from historic metal mining.

None of the alternatives considered in the EE/CA was expected to meet Montana's B-1 standards for surface water quality in Daisy Creek. However, Alternatives 3C will provide a reasonable

measure of mitigation to man-caused mining impacts for a reasonable cost. Given what is known about the source of metals impacts in Daisy Creek, the fact that natural sources contribute a considerable metals load to the creek via groundwater and surface water pathways, and the difficult environmental conditions, eliminating metals impacts from mining related activities will not allow achievement of water quality standards. Alternative 3C will meet most project applicable or relevant and appropriate requirements (ARARs) with the exception of surface water and groundwater standards.

Capping of the consolidated wastes is highly effective at reducing contamination of the environment because the wastes would be contained beneath an engineered cover, eliminating any significant infiltration through the cap and into the waste. The cap will also reduce the quantity of leachate generated by infiltrating precipitation that percolates through the base of the waste into underlying bedrock water-bearing units.

Other alternatives considered in the EE/CA included full treatment of the wastes with a lime amendment, and removal to a repository site in the Soda Butte Creek drainage. Both of these alternatives were considerably more costly to implement than the proposed alternative, and yet neither was thought to enable a Response Action to meet Montana's B-1 standards in Daisy Creek. During the decision making process, consideration was given to forming a combination of alternatives considered in the EE/CA, particularly treating all the wastes and then capping the treated wastes using Alternative 3C. This combined alternative would provide some additional benefit to the Response Action by allowing a certain factor of safety in the event the cap alone does not prevent the wastes beneath the cap from becoming saturated by either vertical or lateral flow through the wastes. In addition, if the cap ever failed due to wear or puncture, the amended wastes would have a much lower propensity to leach metal contaminants than non-treated wastes.

The USDA Forest Service decided not to select a combined alternative involving treatment of the wastes for several reasons. First, wholly treating the wastes on-site would involve several logistical and construction difficulties that would likely add several years to the construction schedule. Logistical problems would include hauling and staging a large quantity of lime amendment in a secure location and manner that keeps the amendment dry and prevents the public from exposure to the amendment. Excavating the waste rock in the pit to a depth of as much as 20 feet would also be required, and stockpiling that waste so that it can be mixed and placed back in the pit presents some construction sequencing issues. Intermediate construction controls would also be required to secure the site for winter shutdown during the several winters that the pit would be open during the amendment process. Second, because there is likely to be considerable difficulty in adequately mixing the wastes with the amendment, amending the wastes may not be completely effective in eliminating acid generation. These logistical and construction difficulties, along with an estimated additional cost of $4.3 million to treat the wastes, can not be justified in light of the anticipated small benefit to water quality that might be gained by treating the waste.

It is the opinion of the USDA Forest Service that, if post removal monitoring indicates the Response Action is not performing to the level expected, the preferred Alternative 3C will not inhibit the implementation of additional removal efforts. Additional efforts that may be linked to improving the isolation of mining-related wastes could involve constructing groundwater cutoff walls upgradient of the pit or constructing reactive barrier walls downgradient of the pit, as well as other potential alternatives that target reducing metal contaminants present in surface water and groundwater that result from man-induced impacts. Post-construction monitoring may involve installing monitoring wells within the capped wastes to determine whether saturation of the wastes occurs, and installing moisture content measuring devices in the wastes directly beneath the cap to determine if the impermeable liner is functioning properly. Future response actions in Daisy Creek would be based on the results of this monitoring as well as monitoring loads in surface water and groundwater downgradient of the pit.

c. Technical Feasibility and Probable Effectiveness

The proposed alternative will effectively reduce contaminant mobility at the site by consolidating the wastes below an impermeable cap. Consolidation and capping are both technically and administratively feasible. Key project components such as equipment, materials, and construction expertise, although distant from the site, are available and would allow the implementation and successful execution of the alternative.

Removing outlying wastes from current locations should be a permanent solution requiring little maintenance and providing long-term effectiveness at the reclaimed waste dump sites. Consequently, surface water erosion and groundwater contamination problems present at the dump sites are expected to be corrected. Infiltration of precipitation through the wastes and migration of contaminants to groundwater will be substantially reduced or eliminated through the construction of a capping system on the consolidated wastes.

d. Further Information

No further information is needed to select the proposed action.

e. Verify Extent of Contamination

Final contours and visual observations will be used to determine when to stop excavating the wastes and underlying contaminated soil at the dump sites that will be consolidated in the pit. Samples from the bottom of excavated areas will be collected and analyzed to verify that contaminant levels in native material below the waste are at acceptable concentrations. Human health goals for solid mine wastes are described in the McLaren Pit EE/CA and are listed in Table 1.

TABLE 1
Cleanup Guidelines for Mine Waste
New World Mining District Response and Restoration Project
McLaren Pit Response Action

	pH (s.u.)[4]	Total Metals (milligrams/kilogram)				
		As	Cd	Cu	Pb	Zn
Human Health Guideline[1]	--	70	1,950	27,100	1,100	220,000
Reclamation Criteria[2]	5.5-8.5	<30	<4	<100	<100	<250
Phytotoxicity Guideline[3]	--	15-50	3-8	60-125	100-400	70-400

Notes: (1) Guidelines recalculated from Tetra Tech (1996). The guidelines are based on a Hazard Index of 0.5 or an increased cancer risk of $5x10^{-5}$ for the recreational visitor scenario.
(2) Criteria used for backfill materials at the Silver Bow Creek/Butte Area Streamside Tailings Operable Unit Remedial Action (ARCO, 1997).
(3) Concentration ranges from Kabata-Pendias and Pendias (1992).
(4) pH in standard units; -- indicates not applicable for this parameter

Since the excavated wastes will be covered with topsoil, these guidelines will not be used as numeric action levels, but rather as a guide in determining whether further excavation is required. Phytotoxicity and reclamation criteria apply to the source used for covering the excavated areas.

f. Sensitive Environments

The headwaters area of Daisy Creek within the influence of mining impacts is severely disturbed. These disturbances have resulted in over 4.5 hectares (11.5 acres) of land that has little vegetation, numerous erosion features, and visually distinct iron staining in strembeds and gullies below the disturbances. The severity of metals impacts within the headwaters of Daisy Creek and downstream more than two miles to the upper reaches of the Stillwater River greatly reduce any likelihood of the presence of sensitive environments. However, road improvements needed to implement this alternative may have some short-term impacts on the Daisy Creek watershed. Increased sedimentation may result from road improvements, although these impacts would be mitigated by using best management practices to control stormwater runoff from the construction area. Roads needed to access waste dumps selected for removal and borrow areas used for earth materials will be reclaimed at completion.

g. Uncertainties

Uncertainties associated with implementing this alternative include the uncertainty involved in predicting the effectiveness of the alternative on water quality improvement. Current models that estimate the loading of contaminants from the headwaters wastes to Daisy Creek show that only a 10% to 20% reduction in loading of copper will be realized through implementing this response action.

The models used to estimate impacts from mining wastes present at the headwaters of Daisy Creek are based on several derived and/or calculated values. These analyses required calculation of several significant climatic variables, including precipitation and mean daily temperature, and estimation of several other parameters using limited data sets. Although both professional judgment and experience were used in deriving these relationships, results of the modeling should be viewed as general results only.

While it would seem that simply reducing the load of constituents exiting the McLaren Pit would lead to an equal reduction in constituent load in Daisy Creek, geochemical model results suggest that a decrease in contaminant load from the headwaters wastes would probably result in a similar magnitude decrease in the in-stream contaminant load only in the upper reaches of Daisy Creek (above 5,000 feet). At downstream distances greater than 5,000 feet, chemical equilibrium processes are active in the stream as metals in solution attempt to come into equilibrium with precipitated solid phases. Concentrations of contaminants in Daisy Creek below 5,000 feet are likely controlled by equilibrium reactions and not by the cumulative load of upstream contaminant sources. Therefore, any additional reduction in in-stream loads should not be expected until reaching a point downstream where other minerals precipitate and new reactions assume control over metal loads carried in Daisy Creek.

Therefore, removing some of the metal load point sources from the headwaters of Daisy Creek may have little effect on water quality in the lower reaches of Daisy Creek at distances greater then 5,000 feet downstream. With a full reduction of 20% in copper concentrations, aquatic standards in Daisy Creek will not be met. In fact, even with a reduction in copper loading of 50%, these same standards will not be met. Reductions of up to 95% would be required to meet aquatic standards in Daisy Creek and the Stillwater River.

h. Institutional Controls

Following construction, a fence will be built around the consolidated wastes to protect against wildlife and vehicle damage. This fence may be removed following successful revegetation of the cap.

i. Off-Site Disposal

Since the material is being consolidated on-site, off-site disposal is not required.

j. Post-Removal Site Controls

Post-removal site control will be required at the removal sites and at the consolidation site in the pit. Post-removal site control at the removal sites will involve monitoring to identify any problems with revegetation or erosion. Monitoring the capped wastes will involve monitoring vegetation on the cap, monitoring moisture in the wastes beneath the cap, monitoring groundwater downgradient of the consolidation area, and monitoring surface water at stations downgradient in Daisy Creek. Sampling will be conducted periodically at established stations.

Monitoring and maintenance of the cover system will involve visually checking the condition of the cap several times during the snow-free season to insure that the vegetative cover is performing adequately and that no erosion or stability problems are occurring. If monitoring shows that environmental conditions have degraded as a result of capping the wastes, corrective action will be taken.

k. Changes Resulting from Public Comments

Written comments on an internal review draft of the McLaren Pit EE/CA were received from the EPA, Montana DEQ, and Department of Interior National Park Service. These comments were considered, modifications were made to the internal review draft based on these comments, and a public Draft EE/CA was prepared.

The Draft EE/CA was released to the public on July 27, 2001 and comments on it were received from the Greater Yellowstone Coalition and the Center for Science in Public Participation. Both parties supported the selection of the preferred alternative. Concerns expressed by the parties in their comments included the following: a concern for the final slope configuration of the capped waste (minimizing the slope to alleviate stability concerns); alternative sources of earthen materials needed to construct the capping system should be sought to reduce haulage costs; and not supporting any alternatives that require lime amendments, which may increase the solubility of arsenic in a treated waste.

The Draft EE/CA that was released to the public did not require any substantive changes because the comments received did not affect the evaluations presented in the EE/CA or the selection of the preferred alternative. The final EE/CA (attached) presents the comments received on the internal review draft and the public draft, and provides a response to each comment.

2. Short-Term Impacts

The major short-term impact to the surrounding community, residents, and wildlife involves increased vehicle traffic and temporary closures of access to some forest roads. An increase in traffic will occur during mobilization and demobilization of construction equipment. Short-term road closures in the project area may also be necessary, limiting access to the forest. Increased traffic may impact wildlife by either changing their daily migration patterns or exposing them to a higher potential for injury or death due to collisions with vehicles.

3. Contribution to Remedial Performance

The McLaren Pit Response Action is one of several response actions that will be completed in the District for the New World Mining District Response and Restoration Project. The McLaren Pit Response Action will stabilize and cap 67% of mining waste on District Property. In so doing, this proposed Response Action would make a substantial contribution toward stabilizing mine waste sources and reducing man-induced loading of metals to District streams. Selection and construction of the preferred Alternative 3C will not prevent or inhibit any further response

actions that may need to be taken in the headwaters of Daisy Creek to meet the terms and intent of the Settlement Agreement and Consent Decree.

4. Description of Alternative Technologies

Removal technologies and process options potentially capable of achieving response action objectives and goals in the headwaters of Daisy Creek were screened in the McLaren Pit Response Action EE/CA (Maxim, 2001a). These technologies included no action, institutional controls, engineering controls, excavation and treatment, and in-situ treatment.

a. Institutional Controls

Institutional controls include land use and access restrictions. Institutional controls by themselves will not prevent migration of the contaminants off-site through groundwater, surface water, or air. Therefore, institutional controls as a separate alternative were not considered. However, institutional controls as components of other alternatives were considered.

b. Engineering Controls

Engineering controls limit the release or threat of release of hazardous substances generally by limiting mobility through isolation, and/or by limiting physical processes necessary for mobility. These measures included removal, containment, chemical fixation, and surface controls. All of these measures were incorporated into the alternatives considered for this site.

c. Waste Disposal

Waste disposal options are used as a source control measure by placing contaminated media in an engineered, controlled environment. Waste control measures evaluated for the Daisy Creek headwaters wastes included consolidation in the pit, in-situ amendment, and partial removal to an on-site, engineered repository. The preferred Alternative 3C uses a capping system that incorporates an impermeable membrane to essentially eliminate potential percolation through the waste. Other alternative cap configurations were evaluated, including soil caps and amended waste caps with and without an impermeable barrier.

d. Miscellaneous Alternatives

Technology types and process options were screened to eliminate those technologies that are obviously unfeasible, while retaining potentially effective options. General response actions and process options were applied to the mitigation of contaminants in the specified waste dumps. No evaluation was conducted for technologies that directly address surface water, groundwater, or streambed sediments because water treatment technologies and mitigation of sediments are beyond the scope of this phase of the response action. The removal of solid wastes does presume that some reduction in contaminant concentrations will occur in surface water, groundwater, and

streambed sediments as a result of removing or controlling the primary sources of contamination present at the headwaters waste dumps.

Various response actions and technology types were evaluated but rejected due to a variety of reasons including uncertainties in effectiveness and high cost. These response actions included: physical/chemical treatments to separate contaminants from the waste, thermal treatments to either vaporize or immobilize contaminants, reprocessing the waste to recover a portion of the metals present in the waste, and off-site disposal.

5. Engineering Evaluation/ Cost Analysis (EE/CA)

An EE/CA that details site characteristics and identifies and develops alternatives was prepared. The USDA Forest Service Interdisciplinary team and specialists from the cooperating agencies analyzed the effects of the alternatives identified in the EE/CA, and considered public comments. The Forest Service then selected a preferred alternative. A copy of the EE/CA is attached (Maxim, 2001a).

6. Applicable or Relevant and Appropriate Requirements (ARARs)

Section 300.415(i) of the National Contingency Plan (NCP) and guidance issued by the EPA require that removal actions attain Applicable or Relevant and Appropriate Requirements (ARARs) under federal or state environmental laws or facility siting laws, to the extent practicable considering the urgency of the situation and the scope of the removal (EPA, 1993). In addition to ARARs, the lead Agency may identify other federal or state advisories, criteria, or guidance to be considered for a particular release. ARARs were identified in the McLaren Pit Response Action EE/CA. .

ARARs are either applicable or relevant and appropriate. Applicable requirements are those standards, requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant found at a site and would apply in the absence of a CERCLA cleanup. Relevant and appropriate requirements are those standards, requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that are not applicable to a particular situation but apply to similar problems or situations, and therefore may be well suited requirements for a response action to address.

ARARs are divided into contaminant specific, location specific, and action specific requirements. Contaminant specific ARARs are listed according to specific media and govern the release to the environment of specific chemical compounds or materials possessing certain chemical or physical characteristics. Contaminant specific ARARs generally set health or risk based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment.

Location specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs generally relate to the geographic location or physical characteristics or setting of the site, rather than to the nature of the site contaminants.

Action specific ARARs are usually technology or activity based requirements or limitations on actions taken with respect to hazardous substances.

Only the substantive portions of the requirements are ARARs. Administrative requirements are not ARARs and do not apply to actions conducted entirely on-site. Provisions of statutes or regulations that contain general goals expressing legislative intent but are non-binding are not ARARs. In addition, in instances like the present case where the cleanup is proceeding in stages, a particular phase of the remedy may not comply with all ARARs, so long as the overall remedy does meet ARARs.

Under Section 121 of CERCLA, 42 U.S.C. §9621, only those state standards that are more stringent than any federal standard are considered to be an ARAR provided that these standards are identified by the state in a timely manner. To be an ARAR, a state standard must be "promulgated," which means that the standards are of general applicability and are legally enforceable. The State of Montana ARARs set forth below have been identified in cooperation with, and with assistance from, the State of Montana Department of Environmental Quality.

a. Federal Contaminant Specific Requirements

Groundwater Standards - Safe Drinking Water Act (Relevant and Appropriate)

The National Primary Drinking Water Standards (40 CFR Part 141), are not applicable to the McLaren Pit Response Action because the aquifer underlying the area is not a current public water system, as defined in the Safe Drinking Water Act, 42 U.S.C. § 300f(4). These standards are relevant and appropriate standards, however, because groundwater in the area is a potential source of drinking water. In addition, because groundwater discharges to District tributaries that may be a source of drinking water, these standards are relevant and appropriate. Maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) are standards promulgated pursuant to both federal and state law. No State MCL is more stringent than the corresponding federal MCL.

Groundwater quality is severely impaired at the headwaters of Daisy Creek and within the wastes in the McLaren Pit. Consolidation of wastes into the pit and capping of the wastes should not degrade groundwater quality and may improve groundwater quality to some degree. However, groundwater is also impacted by natural sources, and the degree of contamination between natural sources and man-caused impacts cannot be discerned at this time. Based on HELP modeling analysis, the cover system constructed for the preferred alternative will eliminate leachate produced by infiltration and released to the underlying groundwater system.

Surface Water - Ambient Standards and Point Source Discharges.

While CERCLA and the NCP provide that federal water pollution criteria are the usual surface water standards to be used as relevant and appropriate standards for removal action cleanups, the State of Montana has promulgated surface water quality standards pursuant to the State of Montana Water Quality Act that are as or more stringent than the federal standards. The State of Montana has designated uses for District tributaries as B-1 and has promulgated specific standards accordingly. Discussions of these standards are included in the State of Montana ARARs discussion.

Air Standards - Clean Air Act (Applicable)

Limitations on air emissions resulting from cleanup activities or emissions resulting from wind erosion of exposed hazardous substances are described in the federal action specific requirements.

b. Federal Location Specific Requirements

The National Historic Preservation Act (Applicable)

This statute and implementing regulations (16 U.S.C. § 470, 40 CFR § 6.310(b), 36 CFR Part 800) require federal agencies or federal projects to take into account the effect of any federally assisted undertaking or licensing on any district, site building, structure, or object that is included in, or eligible for, the National Register of Historic Places.

Compliance with this ARAR is being met through identifying cultural and historic sites and consultation with the State Historic Preservation Office (SHPO). Cultural and historic data collected during the mining company permit application were mapped and reviewed in detail by USDA Forest Service archaeologists. The USDA Forest Service has drafted a Memorandum of Agreement (Agreement) with SHPO that outlines the steps involved with historic resource delineation and protection.

Impacts to historic features associated with the McLaren Pit Response Action are limited to removing and covering mine dumps. Where proposed cleanup actions impact historic or cultural resources, mitigation measures will be taken in accordance with the Agreement. These mitigating measures will be considered for the District as a whole as response actions are initiated. If unknown or undocumented historic properties are discovered during the response action, construction will be halted in the immediate area of the discovery and a USDA Forest Service archeologist will be notified.

Archaeological and Historic Preservation Act (Applicable)

This statute and implementing regulations (16 U.S.C. § 469, 40 CFR § 6.301(c)) establish requirements for evaluation and preservation of historical and archaeological data, including

Indian cultural and historical resources, which may be destroyed through alteration of terrain as a result of federal construction projects or a federally licensed activity or program. If eligible scientific, prehistorical, or archaeological data are discovered during site activities, these resources will be preserved in accordance with these requirements. The procedure for addressing such discoveries is described under the previous National Historic Preservation Act discussion.

Historic Sites, Buildings, and Antiquities Act (Applicable)

This requirement states that "in conducting an environmental review of a proposed EPA action, the responsible official shall consider the existence and location of natural landmarks using information provided by the National Park Service pursuant to 36 CFR § 62.6(d) to avoid undesirable impacts upon such landmarks. Those activities described for the National Historic Preservation Act provide procedures to comply with this ARAR.

Fish and Wildlife Coordination Act (Applicable)

These standards (16 U.S.C. §§ 661 et seq. and 40 CFR § 6.302(g)) require that federally funded or authorized projects ensure that any modification of any stream or other water body affected by a funded or authorized action provide for adequate protection of fish and wildlife resources. Compliance with this ARAR is being satisfied through consultation with the U.S. Fish and Wildlife Service (USFWS) and the State of Montana Department of Fish, Wildlife, and Parks (FWP).

Floodplain Management Order (Not Applicable)

This requirement (40 CFR Part 6, Appendix A, Executive Order No. 11,988) mandates that federally funded or authorized actions within the 100 year flood plain avoid, to the maximum extent possible, adverse impacts associated with development of a floodplain. Compliance with this requirement is detailed in EPA's August 6, 1985 "Policy on Floodplains and Wetlands Assessments for CERCLA Actions." This order would be applicable if the McLaren Pit was located in a floodplain but, since no designated 100-year floodplain will be affected by the McLaren Pit Response Action, this requirement is not applicable.

Protection of Wetlands Order (Not Applicable)

This requirement (40 CFR Part 6, Appendix A, Executive Order No. 11,990) mandates that federal agencies avoid, to the extent possible, adverse impacts associated with the destruction or loss of wetlands. The order also provides that activities avoid construction in wetlands if a practicable alternative exists. Section 404(b)(1), 33 U.S.C. § 1344(b)(1) prohibits discharge of dredged or fill material into waters of the United States. This order would be applicable if wetlands were present in the McLaren Pit but, since no wetlands will be impacted by the McLaren Pit Response Action, this requirement is not applicable.

The Endangered Species Act (Relevant and Appropriate)

This statute and implementing regulations (16 U.S.C. §§ 1531 - 1543, 50 CFR Part 402, and 40 CFR § 6.302(h)) require that any federal activity or federally authorized activity may not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify a critical habitat.

Threatened and endangered species are present in or near the District. During development of CBMI's permit application, consultation with the USFWS identified the grizzly bear, bald eagle, peregrine falcon, and gray wolf as threatened and endangered species that may be present in the project area. The Endangered Species Act is not applicable because no critical habitat was designated or proposed in the project area, but certain provisions of the Act may be relevant and appropriate. Threatened and endangered species are present in or near the District. During development of the Draft Environmental Impact Statement for CBMI's proposed mine in the District, consultation with the U.S. Fish and Wildlife Service identified the grizzly bear, bald eagle, peregrine falcon, and gray wolf as threatened and endangered species that may be present in the project area. Threatened and endangered species (primarily the grizzly bear) will not likely be impacted, as new disturbances will be limited to upgrading existing roads, developing a soil borrow area within the District, and constructing a spur road below the McLaren Pit. Disturbances from increased traffic during construction should be short-term, and there are no permanent facilities required under this alternative. Although construction and implementation of the preferred alternative will require an increased level of activity, long-term maintenance will not require a level of activity that is greater than that existing under current conditions. In the long term, consolidation of waste in the District should serve to enhance wildlife habitat by removing some mining wastes from the landscape and placing it into secure disposal sites and allowing previously contaminated areas to revegetate. The USFWS is being consulted to comply with this requirement and measures will be taken to mitigate removal activities if adverse impacts are identified.

Migratory Bird Treaty Act (Applicable)

This requirement (16 U.S.C. §§ 703 et seq.) establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the USFWS during design and construction to ensure that cleanup does not unnecessarily impact migratory birds. The USFWS is being consulted to comply with this requirement and measures will be taken to mitigate removal activities if adverse impacts are identified.

Bald Eagle Protection Act (Applicable)

This requirement (16 U.S.C. §§ 668 et seq.) establishes a federal responsibility for protection of bald and golden eagles, and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that any cleanup of the site does not unnecessarily adversely affect the bald and golden eagle. The USFWS is being consulted to comply with this

requirement and measures would be taken to mitigate removal activities if adverse affects are identified.

c. Federal Action Specific Requirements

RCRA Requirements (Relevant and Appropriate)

RCRA hazardous waste requirements are not applicable to District Property wastes in accordance with 40 CFR § 261.4(b)(7) (the Bevill exemption). In addition, many RCRA regulations are not applicable because this removal action will only consolidate mining wastes from a single area of contamination in an in-situ waste pile, and not create a new waste cell. Nevertheless, certain RCRA hazardous waste regulations (which are identical to state hazardous waste regulations) concerning covering waste piles and runon/runoff controls have been determined to be relevant and appropriate in the handling of these wastes. The following regulations are relevant and appropriate:

- RCRA regulations found at 40 CFR §§ 264.310(a), and (b)(1), and (5) (regarding final cover, run-on and run-off controls), which are identical to state solid waste regulations, are relevant and appropriate requirements for the consolidation site to be used for waste management and disposal, although the 40 CFR Part 258 standards for solid wastes provide more specific guidance.

Alternative 3C includes elements typical of designs for Class II and RCRA waste disposal facilities. In particular, a composite cover system will utilize (from top to bottom) a vegetated cover consisting of soil, a drainage layer to capture infiltrating precipitation, and a synthetic cover liner consisting of a geomembrane. Consolidated mine waste will be compacted as it is placed to prevent settling and damage to the soil cover system, and run-on will be diverted around the capped area. All run-on and runoff controls will be engineered to handle water flows that arise during spring runoff.

No point discharge of contaminants will be released from the capped pit. Engineering analysis of the performance of the cover liner predicts that essentially no leachate will migrate through the bottom of the capped waste.

Solid Waste Requirements (Relevant and Appropriate)

The Federal solid waste regulations (40 CFR Part 258) are not applicable because, under 40 CFR § 258.1(c), these criteria are only for new disposal units. This removal action will only consolidate mining wastes, primarily overburden material, in an in-situ waste pile, and not create a new solid waste unit. In addition, the siting and location regulations are not relevant and appropriate because no siting of a new unit is taking place. Nevertheless, certain solid waste regulations concerning covering waste piles and runon/runoff controls have been determined to be relevant and appropriate in the handling of these wastes. The following regulations are relevant and appropriate:

- Requirements described at 40 CFR §§ 258.60(a) and 258.61(a)(1), governing cover requirements and runon/runoff controls.

Surface Mining Control and Reclamation (Relevant and Appropriate),

Regulations promulgated under the Surface Mining Control and Reclamation Act (30 CFR, Part 816 and 784) cover reclamation requirements for coal and certain non-coal mining operations. Reclamation of the removed dump sites, capped wastes, and other disturbed areas will generally conform to these requirements. Revegetation requirements will follow prescriptions developed by the USDA Forest Service Rocky Mountain Research Station. These prescriptions are based on 23 years of site specific research involving reclamation of mine wastes at high altitudes and restoration of native plant communities. Revegetation prescriptions have been designed to regenerate under the natural conditions prevailing at the site. Site specific research indicates that revegetation will be permanent, diverse, predominantly native, and of the same seasonality and utility found in similar pre-disturbance areas. Cover, planting, and stocking specifications are based on local and regional conditions.

Erosion control will be accomplished using best management practices to prevent deterioration of water quality or quantity and prevent erosion resulting from roads. Following removal, revegetated areas will be capable of supporting designated land uses, will blend with the surrounding topography, and meet slope restrictions.

Air Standards - Clean Air Act (Applicable)

The state standards, promulgated in accordance with Section 109 of the Clean Air Act, are applicable to releases into the air from removal action activities, but the national ambient air standards are not. Ambient air standards for lead are promulgated at Administrative Rules of Montana (ARM) 16.8.815 as part of a federally approved State Implementation Plan (SIP), in accordance with the Clean Air Act of Montana, §§ 75-2-101 et seq., Montana Codes Annotated (MCA). Corresponding federal regulations are 40 CFR § 50.12. The lead standard provides that no person shall cause or contribute to concentrations of lead in the ambient air that exceed 1.5 micrograms per cubic meter ($\mu g/m^3$) of air, measured over a 90-day average.

Regulations promulgated at ARM 16.8.821 as part of the SIP (§§ 75-2-101 et seq., MCA) apply to particulate matter that is 10 microns in diameter or smaller (PM-10). Corresponding federal regulations are 40 CFR § 50.6. According to this standard, no person shall cause or contribute to concentrations of PM-10 in the ambient air which exceed 150 $\mu g/m^3$ of air for a 24 hour average with no more than one expected exceedance per calendar year or 50 $\mu g/m^3$ of air on an annual average.

For the McLaren Pit Response Action, sampling data indicated that lead concentrations are not at levels that are high enough to be of concern to human health. Furthermore, based on field investigation, dump materials are primarily of a grain size that is not susceptible to wind transport. Therefore, based on these waste characteristics, removal operations that involve

excavation, loading, hauling, and placing wastes are not expected to exceed these two air quality standards. However, to ensure blowing dust is controlled, best management practices will be incorporated into the removal action as site conditions require mitigating actions.

Ambient air standards under Section 109 of the Clean Air Act are also promulgated for carbon monoxide, hydrogen sulfide, nitrogen dioxide, sulfur dioxide, and ozone. If emissions of these compounds were to occur at the site in connection with any cleanup action, these standards would also be applicable (40 CFR Part 50). Carbon monoxide, hydrogen sulfide, nitrogen dioxide, sulfur dioxide, or ozone are not expected to be generated during the removal action beyond those levels normally associated with internal combustion engines. Therefore, no measures will be needed to accommodate these standards.

Point Source Controls - Clean Water Act (Applicable)

If point sources of water contamination are retained or created during the McLaren Pit Response Action, applicable Clean Water Act standards would apply. The regulations are discussed in the contaminant specific ARAR section, above, and in the State of Montana identification of ARARs. These regulations include storm water runoff regulations (40 CFR Parts 121, 122, and 125) and include requirements for best management practices and monitoring (40 CFR §§ 122.44(i) and 440.148) for point source discharges. Best management practices for stormwater runoff will be included in the construction requirements for the McLaren Pit Response Action.

Transportation of Hazardous or Contaminated Waste (Relevant and Appropriate)

40 CFR Part 263 establishes regulations for the transportation of hazardous waste. These regulations would govern any on-site transportation of material. No off-site transportation of wastes will occur in the McLaren Pit Response Action. Transportation of waste materials will be done in such a manner as to eliminate the spread of waste along haul roads and to immediately cleanup any spills that may occur during haul operations.

Occupational Safety and Health Act (Applicable)

Occupational Safety and Health Administration requirements will be met by requiring appropriate safety training for all on-site workers during construction phase. Site activities will be conducted under the guidance of a Health and Safety Plan for the site per OSHA 29 CFR § 1910.120. Site personnel will have completed 40-hour hazardous waste operations and emergency response training and will be current with the 8-hour annual refresher training as required by OSHA 29 CFR § 1910.120.

d. Montana Contaminant Specific Requirements

Surface Water Quality Standards (Relevant and Appropriate)

Under the State of Montana Water Quality Act, §§ 75-5-101 et seq., MCA, the state has promulgated regulations to protect, maintain, and improve the quality of surface waters in the state. Although the point source discharge requirements of the Act are not applicable because the McLaren Pit Response Action will not create any point source discharge, the requirements listed below are relevant and appropriate water quality standards to the McLaren Pit Response Action.

The State of Montana has classified the streams in the District as B-1. The definition of B-1 waters are waters that are suitable for drinking, culinary and food processing (after conventional treatment), bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. The B-1 stream classification also sets forth standards for coliform bacteria, dissolved oxygen content, pH, turbidity, temperature, sediment or floating solids, color, and concentrations of toxic or harmful parameters as specified in Circular WQB-7. The state is also in the process of developing total maximum daily loads (TMDLs) for the Cooke City Planning Area. A TMDL is a pollutant budget developed at a level where water quality standards will not be exceeded. The TMDL accounts for loads from point and non-point sources in addition to natural background loads. A draft Water Quality Restoration Plan for the Cooke City Planning Area is expected to be released to the public for comment in early 2002.

On June 4, 2000, the Montana Board of Environmental Review adopted a rule for temporary water quality standards on portions of Fisher Creek, Daisy Creek, and the Stillwater River. Temporary standards will be in effect for 15 years, at which time the water quality issues in the District will be reevaluated by the USDA Forest Service and the Montana Department of Environmental Quality.

For the McLaren Pit Response Action, the targeted waste dumps that will be removed are all located in the Daisy Creek watershed. The applicable temporary water quality standards for Daisy Creek apply at surface water station DC-5 and at station SW-7 on the Stillwater River. Narrative standards apply at any point in the two streams, upstream of SW-7. Narrative standards are based on plus or minus two (2) standard deviations from the mean for the sampling period of record. Numeric temporary standards for the two established stations are listed below in micrograms per liter:

Parameter	DC-5 (µg/L)	SW-7 (µg/L)
Aluminum	9,510	670
Cadmium	4	NA
Copper	3,530	200
Iron	6,830	1,320
Lead	NA	13
Manganese	1,710	86
Zinc	540	49
pH	> 4.6 s.u.	> 5.5 s.u.

Additional restrictions on any discharge to surface waters are included in ARM 17.30.637 (Applicable), which prohibits discharges containing substances that will:

(a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;

(b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;

(c) produce odors, colors, or other conditions that create a nuisance, or render undesirable tastes to fish flesh or make fish inedible;

(d) create concentrations or combinations of materials that are toxic or harmful to human, animal, plant, or aquatic life;

(e) create conditions that produce undesirable aquatic life.

ARM 17.30.925 (Applicable) adopts and incorporates the provisions of 40 C.F.R. Part 125 for criteria and standards for the imposition of technology-based treatment requirements in MPDES permits. The permit requirement would not apply to on-site discharges because it is not substantive, and the substantive requirements of Part 125 would not be applicable because there will be no point source discharge at the site.

One relevant and appropriate provision of the Act for both surface water and ground water, §75-5-605, MCA, provides that it is unlawful to cause pollution as defined in § 75-5-103 of any state waters or to place or cause to be placed any wastes where they will cause pollution of any state waters. In this instance, the selected Response Action is in compliance because it prevents future pollution of state waters, and does not cause additional pollution.

Temporary water quality standards are currently being met in Daisy Creek and the Stillwater River under existing conditions. However, contaminant-specific standards associated with the Montana Water Quality Act, with the exception of chromium (which is already in compliance), will not be achieved under Alternative 3C without further remediation as part of a subsequent

cleanup phase. The reasons for this are several, including the presence of a large body of near-surface sulfide mineralization present in the Daisy Creek headwaters that contributes metal and pH impacts to groundwater and surface water. This natural source of impacted drainage may be at levels that preclude aquatic life in Daisy Creek, regardless of mining impacts present in the headwaters area.

Some improvement in surface water quality in the uppermost reaches of Daisy Creek (0-5,000 feet downstream) is expected because soluble concentrations of copper and zinc would be slightly reduced. However, HELP and load modeling studies estimate that the unconsolidated McLaren Pit wastes only contribute 10-20% of the total load to Daisy Creek. As stated earlier in this memorandum, even a reduction of 50% of the load in Daisy Creek will not bring the waters into compliance with the established surface water standards. At surface water station SW-7 on the Stillwater River, concentrations of aluminum and copper will still exceed chronic aquatic life standards after implementation of the preferred alternative for the McLaren Pit Response Action. While the preferred alternative will eliminate or greatly reduce contaminant leaching from waste rock, contaminant-specific standards for Daisy Creek will not be met.

Surface water quality at station DC-5, will improve slightly as a direct result of treating the McLaren wastes under Alternative 3C. This slight improvement in water quality is limited by control of water chemistry at DC-5, as the water chemistry at DC-5 appears to be controlled by mineral precipitates and metals sorption rather than by upstream loading. Erosion from the revegetated waste dumps would also be greatly reduced, reducing sediment loading that currently reports to Daisy Creek. A reduction of precipitates in Daisy Creek would also be achieved under the Alternative 3C.

Groundwater Pollution Control System (Applicable)

ARM 17.30.1006 (Applicable) classifies groundwater into Classes I through IV based on the present and future most beneficial uses of the groundwater, and states that groundwater is to be classified according to actual quality or actual use, whichever places the groundwater in a higher class. Class I is the highest quality class; Class IV the lowest. Based upon its specific conductance, the great majority of the groundwater in the District should be considered Class I groundwater.

ARM 17.30.1011 (Applicable) generally prohibits the degradation of groundwater, and the Response Action will comply with this ARAR because capping of the mine wastes should result in improvements in groundwater quality and prevent further degradation. Groundwater quality is known to be impacted downgradient from the mine site and the degree to which it is contaminated has been documented. Groundwater quality varies considerably depending on the bedrock formation where it is measured. Generally, groundwater quality is poorest in wells completed in the Meagher Limestone (the mineralized formation), the Fisher Mountain Intrusive, and McLaren Pit waste rock. Groundwater quality is best in wells completed in the Woolsey Shale.

Groundwater studies are ongoing, as a series of hydrologic study wells will be completed in, around, and downgradient of the McLaren Pit. Capping and in-situ treatment of unconsolidated wastes will likely have a positive effect on groundwater in the immediate vicinity of the capped wastes. It will likely have only minor positive effects on groundwater downgradient of the pit, as natural sources of metals in the sulfide near-surface ore body at the headwaters of Daisy Creek causes some natural degradation of groundwater. Improvements in groundwater quality resulting from this phase of cleanup will be evaluated, and subsequent response actions will be developed to further improve groundwater quality as necessary.

Air Quality

In addition to the standards identified in the federal action specific ARARs above, the State of Montana has identified certain air quality standards in the action specific section of the State action specific ARARs below.

e. Montana Location Specific Requirements

Not Applicable

f. Montana Action Specific Requirements

In the following action-specific ARARs, the nature of the action triggering applicability of the requirement is stated in parentheses as part of the heading for each requirement.

Groundwater Act (Applicable) (Construction and maintenance of groundwater wells)

Section 85-2-505, MCA, (Applicable) precludes the wasting of groundwater. Any well producing waters that contaminate other waters must be plugged or capped, and wells must be constructed and maintained to prevent waste, contamination, or pollution of groundwater.

Monitoring wells have been constructed in the headwaters of Daisy Creek to monitor groundwater levels and water quality following capping of the McLaren consolidated wastes. Any additional monitoring wells will be constructed in accordance with state monitoring well regulations to assure that pollution will not be spread between aquifers. Since monitoring wells are not producing wells, no groundwater will be wasted.

Air Quality Regulations (Applicable) (Excavation/earth-moving; transportation)

Dust suppression and control of certain substances likely to be released into the air as a result of earth moving, transportation and similar actions may be necessary to meet air quality requirements. Certain ambient air standards for specific contaminants and particulates are set forth in the federal action specific section above. Additional air quality regulations under the state Clean Air Act, §§ 75-2-101 et seq., MCA, are discussed below.

ARM 17.8.1302 (Applicable) lists certain wastes that may not be disposed of by open burning, including oil or petroleum products, RCRA hazardous wastes, chemicals, and treated lumber and timbers. Any waste which is moved from the premises where it was generated and any trade waste (material resulting from construction or operation of any business, trade, industry or demolition project) may be open burned only in accordance with the substantive requirements of 17.8.1307 or 1308.

No burning of waste will be conducted to complete this project.

ARM 17.8.1401(1) and (2) (Applicable) provides that no person shall cause or authorize the production, handling, transportation or storage of any material; or cause or authorize the use of any street, road, or parking lot; or operate a construction site or demolition project, unless reasonable precautions to control emissions of airborne particulate matter are taken. Emissions of airborne particulate matter must be controlled so that they do not "exhibit an opacity of twenty percent (20%) or greater averaged over six consecutive minutes." ARM 17.8.1401(1) and (2) (Applicable) and ARM 17.8.1404 (Applicable).

In addition, state law provides an ambient air quality standard for settled particulate matter. Particulate matter concentrations in the ambient air shall not exceed the following 30-day average: 10 grams per square meter. ARM § 17.8.818 (Applicable).

ARM 17.8.1401(4) (Applicable) requires that any new source of airborne particulate matter that has the potential to emit less than 100 tons per year of particulates shall apply best available control technology (BACT); any new source of airborne particulate matter that has the potential to emit more than 100 tons per year of particulates shall apply lowest achievable emission rate (LAER). The BACT and LAER standards are defined in ARM 16.8.1430. Precautions will be taken during construction to limit dust emissions from removal activities.

ARM 17.24.761 (Relevant and Appropriate) specifies a range of measures for controlling fugitive dust emissions during mining and reclamation activities. Some of these measures could be considered relevant and appropriate to control fugitive dust emissions in connection with excavation, earth moving, and transportation activities conducted as part of the removal. Such measures include watering or frequently compacting and scraping roads, promptly removing rock, soil or other dust-forming debris from roads, restricting vehicle speeds, revegetating, mulching, or otherwise stabilizing the surface of areas adjoining roads, restricting unauthorized vehicle travel, minimizing the area of disturbed land, and promptly revegetating regraded lands.

Fugitive dust will be generated with earth moving activities and transportation of materials on unpaved roads. Road dust will be suppressed by the contractor through watering.

Solid Waste Regulations

The State regulations concerning final cover requirements, runon/runoff controls, and monitoring that are more specific than the Federal regulations are applicable to the Response Action. To some extent these regulations are superceded by State mine reclamation regulations, which are more specific. Implementing Alternative 3C for this Response Action at the McLaren Pit will comply with the requirements for final cover, runon/runoff controls, and monitoring. Compliance with these requirements is explained in the discussion on Reclamation Requirements (below) and the Federal Action Specific Requirements section (above).

Reclamation Requirements

The Strip and Underground Mine Reclamation Act, §§ 82-4-201 et seq., MCA, technically applies to coal and uranium mining, but that statute and the regulations promulgated under that statute and discussed in this section set out the standards that mine reclamation should attain. To the extent they are more stringent than the federal regulatory scheme contained in the Surface Mining Control and Reclamation Act (see 30 CFR Parts 789, 816), the State requirements identified here have been determined to be relevant and appropriate requirements for this action.

Section 82-4-231 (Relevant and Appropriate) requires the reclamation and revegetation of the land. In developing a method of operation and plans of backfilling, water control, grading, topsoiling and reclamation, all measures shall be taken to eliminate damages to landowners and members of the public, their real and personal property, public roads, streams, and all other public property from soil erosion, subsidence, landslides, water pollution, and hazards dangerous to life and property.

Sections 82-4-231(10)(j) and (i) and ARM 17.24.751 (Relevant and Appropriate) provide that reclamation of mine waste materials shall, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts of the operation on fish, wildlife, and related environmental values and achieve enhancement of such resources where practicable, and shall avoid acid or other toxic mine drainage by such measures as preventing or removing water from contact with toxic-producing deposits.

ARM 17.24.641 (Relevant and Appropriate) also provides that drainage from acid-forming or toxic-forming spoil into ground and surface water must be avoided by preventing water from coming into contact with such spoil. ARM 17.24.505 (Relevant and Appropriate) similarly provides that acid, acid-forming, toxic, toxic-forming or other deleterious materials must not be buried or stored in proximity to a drainage course so as to cause or pose a threat of water pollution.

Revegetation will be an integral part of the McLaren Pit Response Action design and construction package. Utilizing nearly 25 years of site specific revegetation trials, the USDA Forest Service has developed revegetation prescriptions that substantially comply with all requirements of the Strip and Underground Mine Reclamation Act. Revegetation is an integral

part of the removal action because vegetation protects the removal sites and the cap from erosion. Disturbed areas will be revegetated in accordance with the revegetation prescriptions such that revegetation is rapid and effective.

Reclamation Activities - Hydrology Regulations (Relevant and Appropriate)

The hydrology regulations provide guidelines for addressing the hydrologic impacts of mine reclamation activities and earth moving projects and are relevant and appropriate for addressing these impacts associated with the McLaren Pit Response Action.

ARM 17.24.631 (Relevant and Appropriate) provides that long-term adverse changes in the hydrologic balance from mining and reclamation activities, such as changes in water quality and quantity, and location of surface water drainage channels shall be minimized. Water pollution must be minimized and, where necessary, treatment methods utilized. Diversions of drainages to avoid contamination should be used in preference to the use of water treatment facilities. Other pollution minimization devices must be used if appropriate, including stabilizing disturbed areas through land shaping, diverting runoff, planting quickly germinating and growing stands of temporary vegetation, regulating channel velocity of water, lining drainage channels with rock or vegetation, mulching, and control of acid-forming, and toxic-forming waste materials.

During construction of the McLaren Pit Response Action, storm water controls will be in place and vegetation will be established following construction to minimize erosion. Temporary diversion channels needed to direct stormwater runoff from the construction area will be constructed to minimize erosion. Acid forming wastes will be consolidated and capped beneath an engineered cover. The capping system will minimize any contact of waste with surface water.

ARM 17.24.635 through 17.24.637 (Relevant and Appropriate) set forth requirements for temporary and permanent diversions. Temporary diversion channels will be designed in consideration of the drainage basin contributing flow to the channels. Erosion will be avoided by using rock lining.

ARM 17.24.638 (Relevant and Appropriate) specifies sediment control measures to be implemented during operations. An erosion control plan will be required that sets forth methods to control sediment during construction.

ARM 17.24.640 (Relevant and Appropriate) provides that discharge from sedimentation ponds, permanent and temporary impoundments, and diversions shall be controlled by energy dissipaters, riprap channels, and other devices, where necessary, to reduce erosion, prevent deepening or enlargement of stream channels, and to minimize disturbance of the hydrologic balance. Sediment basins will be designed with overflow pipes that discharge to existing drainages. Drainages will be rock lined at the discharge points.

Reclamation and Revegetation Requirements (Relevant and Appropriate)

ARM 17.24.501 and 501A (Relevant and Appropriate) set forth general backfilling and final grading requirements. Excavated areas will be backfilled to blend with the surrounding undisturbed topography. Backfill will be suitable for establishment of vegetative cover.

ARM 17.24.519 (Relevant and Appropriate) provides that an operator may be required to monitor settling of regraded areas. Long-term monitoring of revegetated areas has been established as a project objective; planning documents provide guidance for long-term monitoring.

ARM 17.24.702 (Relevant and Appropriate) requires that during the redistributing and stockpiling of soil (for reclamation):

1. regraded areas must be prepared to eliminate any possible slippage potential, to relieve compaction, and to promote root penetration and permeability of the underlying layer; this preparation must be done on the contour whenever possible and to a minimum depth of 12 inches;
2. redistribution must be done in a manner that achieves approximate uniform thickness consistent with soil resource availability and appropriate for the postmining vegetation, land uses, contours, and surface water drainage systems; and

3. redistributed soil must be reconditioned by subsoiling or other appropriate methods.

These criteria will be addressed through the design of the McLaren Pit Response Action. Regraded materials will have slopes that match the surrounding topography and will generally be constructed to be no steeper than 3H:1V. Thickness of topsoil or growth medium will be specified in the contract documents. Regraded soil surfaces will be chiseled using standard farming techniques to promote plant establishment.

ARM 17.24.703 (Relevant and Appropriate). When using materials other than, or along with, soil for final surfacing in reclamation, the operator must demonstrate that the material (1) is at least as capable as the soil of supporting the approved vegetation and subsequent land use, and (2) the medium must be the best available in the area to support vegetation. Such substitutes must be used in a manner consistent with the requirements for redistribution of soil in ARM 17.24.701 and 702.

To comply with this requirement, coversoil will be obtained from suitable borrow sites either in Daisy Creek, Miller Creek, or the SB-4B(I) repository site. Agronomic tests were conducted on these materials to ensure the soils are a viable plant medium.

ARM 17.24.711 (Relevant and Appropriate) requires that a diverse, effective, and permanent vegetative cover of the same seasonal variety and utility as the vegetation native to the area of land to be affected shall be established except on road surfaces and below the low-water line of permanent impoundments. The vegetative cover must also be capable of meeting the criteria set forth in 82-4-233, MCA. Vegetative cover is considered of the same seasonal variety if it consists of a mixture of species of equal or superior utility when compared with the natural vegetation during each season of the year. (See also ARM 17.24.716 below regarding substitution of introduced species for native species.)

ARM 17.24.713 (Relevant and Appropriate) provides that seeding and planting of disturbed areas must be conducted during the first appropriate period for favorable planting after final seedbed preparation.

ARM 17.24.714 (Relevant and Appropriate) requires use of a mulch or cover crop or both until an adequate permanent cover can be established. Use of mulching and temporary cover may be suspended under certain conditions.

ARM 17.24.716 (Relevant and Appropriate) establishes the required method of revegetation, and provides that introduced species may be substituted for native species.
ARM 17.24.718 (Relevant and Appropriate) requires the use of soil amendments and other means such as irrigation, management, fencing, or other measures, if necessary to establish a diverse and permanent vegetative cover.

All revegetation requirements included in the above ARMs will be complied with using site specific revegetation research results. Nearly 25 years of research was conducted by the USDA Forest Service at the site, primarily through the guidance of Dr. Ray Brown, an eminent scientist stationed at the Rocky Mountain Research Station in Logan, Utah. Through his work, the USDA Forest Service has developed revegetation prescriptions that substantially comply with revegetation requirements. All disturbed areas will be revegetated in accordance with the revegetation prescriptions such that revegetation is effective, permanent, self-sustaining, and native. Soil amendments and revegetation treatments such as lime, fertilizer, mulch, erosion control blankets, and organic amendments are all included in the revegetation prescriptions.

g. Non-Compliance with ARARs

The response action selected in this phase of the overall cleanup, specifically Alternative 3C, will assist in achieving ARARs at the site. Surface water and groundwater quality is expected to improve to some extent by implementing the preferred alternative, and it will be evaluated for further cleanup as necessary. Implementing the preferred Response Action will not hinder further Response Actions that may be required at the site

7. Project Schedule

It is likely that implementation of the McLaren Pit Response Action will require two construction seasons to complete. An engineering design will be prepared during the winter of 2001/2002 and construction package will be advertised for bid in the spring of 2002. A contractor is expected to be selected by the end of June 2002 with construction commencing in late July 2002. Earthwork involved with the consolidation of wastes would be completed during the first construction season. Stockpiling of materials needed in construction of the capping system may also be done in 2002, including the development of any borrow areas needed for soil and rock materials. In July 2003, construction of the capping system would commence with the laying of the impermeable membrane, followed by construction of the drainage layer and the soil cover. Construction of the McLaren Pit Response Action should be completed by October 2003.

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B. Estimated Costs

The estimated cost to consolidate and cap the wastes in the McLaren Pit, including road construction and reclamation is about $4.1 million. The estimated total cost of the McLaren Pit Response Action, including design, construction oversight, and post-removal site control is $4.6 million.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN.

If no action is taken to stabilize wastes and isolate wastes from surface water and groundwater, the site will continue to be degraded and present a risk to human and ecological receptors.

VII. OUTSTANDING POLICY ISSUES

None

VIII. ENFORCEMENT

Although the USDA Forest Service specifically denies any liability in this situation, it will be the "lead agency" for all response actions occurring on National Forest System Lands, as defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR part 300, and all response actions will be undertaken in a manner not inconsistent with the NCP. A Consent Decree and Settlement Agreement between the United States, several signature parties, and CBMI is the legal mechanism that outlines responsibilities of the parties to the agreement, the process, and the funds that will be used for cleanup.

IX. RECOMMENDATION

This decision document represents the McLaren Pit Response Action for the removal and disposal of selected sources associated with the Daisy Creek drainage of New World Mining District Response and Restoration Project. The project is situated in the Gardiner Ranger District of the Gallatin National Forest and the Beartooth Ranger District of the Custer National Forest. This document was developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the site. Conditions at the site meet the NCP section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed removal action.

_____ _____

Mary Beth Marks Date
On-Scene Coordinator (OSC)

I concur with the recommendation to implement the proposed alternatives as described in this Action Memorandum and attached Engineering Evaluation/Cost Analysis for the McLaren Pit Response Action, New World Mining District Response and Restoration Project.

_____ _____

Ken Britton Date
District Ranger
Gardiner Ranger District

I concur with the recommendation to implement the proposed alternatives as described in this Action Memorandum and attached Engineering Evaluation/Cost Analysis for the McLaren Pit Response Action, New World Mining District Response and Restoration Project.

_____ _____

Becki J. Heath Date
Forest Supervisor
Gallatin National Forest

I concur with the recommendation to implement the proposed alternatives as described in this Action Memorandum and attached Engineering Evaluation/Cost Analysis for the McLaren Pit Response Action, New World Mining District Response and Restoration Project.

_____ _____

Rand Herzberg Date
District Ranger
Beartooth Ranger District

I concur with the recommendation to implement the proposed alternatives as described in this Action Memorandum and attached Engineering Evaluation/Cost Analysis for the McLaren Pit Response Action, New World Mining District Response and Restoration Project.

_____ _____

Nancy T. Curriden Date
Forest Supervisor
Custer National Forest

I concur with the recommendation to implement the proposed alternatives as described in this Action Memorandum and attached Engineering Evaluation/Cost Analysis for the McLaren Pit Response Action, New World Mining District Response and Restoration Project.

_____ _____

Bob Kirkpatrick Date
USDA Project Coordinator
Northern Region

I approve of the proposed removal action as outlined in the Action Memorandum and attached Engineering Evaluation/Cost Analysis for the McLaren Pit Response Action, New World Mining District Response and Restoration Project.

_____ _____

Bradley Powell Date
Regional Forester
Northern Region